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Drylands under pressure: vegetation modeling of dryland ecosystems in the Sahel

Wim Verbruggen (1,2), Guy Schurgers (2), Marie Combe (1), Manfredo di Porcia e Brugnera (1), Torbern Tagesson (2,3), Rasmus Fensholt (2), Stéphanie Horion (2), Jonas Ardö (3), Bernard Cappelaere (4), Jerome Demarty (4), Laurent Kergoat (5), Thomas Sibret (1), and Hans Verbeeck (1)

(1) CAVELab - Computational and Applied Vegetation Ecology, Department of Environment, Ghent University, Ghent, Belgium, (2) Department of Geosciences and Natural Resource Management, Copenhagen University, Copenhagen, Denmark, (3) Department of Physical Geography and Ecosystem Science, Lund University, Lund, Sweden, (4) HydroSciences Montpellier, IRD/CNRS, Université de Montpellier, Montpellier, France, (5) Géosciences Environnement Toulouse, CNRS/UPS/IRD, Toulouse, France

Dryland ecosystems form a major land cover (40% of the Earth's surface, accounting for approximately 40% of the global net primary productivity) that is largely under pressure due to global change and human activities, but which is also largely understudied.

Our research hence aims to bridge current knowledge gaps in the paleotropics by unraveling the driving mechanisms of vegetation shifts in the Sahel. To do this, we combine in-situ measurements with dynamic global vegetation models (DGVMs) and remote sensing observations. In this presentation we show our first model results with two state-of-the-art DGVMs (the Ecosystem Demography model, ED2, and the Lund-Potsdam-Jena General Ecosystem Simulator, LPJ-GUESS), which we adapted to Sahel-specific conditions. Our parameterization of these models is based on recent in-situ measurements of meteorological conditions and plant functional traits. For validation purposes, we compare our model's primary productivity with flux tower measurements of carbon exchange across six Sahel sites. We finally discuss the usefulness of remote sensing data integration into ED2 and LPJ-GUESS, and support this discussion with a first assessment of key model sensitivities.